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2 **CLAIMS**

- 3 Sub
A1
- 4 1. An automotive computing device memory system comprising:
- 5 non-volatile storage configured to hold object store pages for an automotive
- 6 computing device;
- 7 dynamic random access memory (DRAM) operably associated with the
- 8 non-volatile storage and configured to receive object store pages; and
- 9 static random access memory (SRAM) operably associated with the non-
- 10 volatile memory and configured for connection to a battery so that one or more
- 11 object store pages can be preserved therein in the event of an automotive power
- 12 loss.
- 13 2. The automotive computing device memory system of claim 1,
- 14 wherein the non-volatile storage comprises flash memory.
- 15
- 16 3. The automotive computing device memory system of claim 1,
- 17 wherein the DRAM comprises one or more DRAMs or SDRAMs.
- 18
- 19 4. The automotive computing device memory system of claim 1 further
- 20 comprising a battery operably couplable with the SRAM responsive to an
- 21 automotive power loss.
- 22
- 23
- 24
- 25

10. An automotive computing device comprising:
one or more microprocessors configured to be powered by a automotive
voltage source;
static random access memory (SRAM) operably coupled with the one or
more microprocessors, the SRAM being configured to receive one or more pages,
under the influence of the one or more microprocessors, from one or more of non-
volatile storage or volatile storage that can be carried by an automotive vehicle;
and
a backup battery couplable with the SRAM to provide power in the event
that the automotive voltage source drops out of regulation.

11. The automotive computing device of claim 10 further comprising
power control circuitry associated with the SRAM and configured to determine
when the automotive voltage source drops out of regulation and then automatically
couple the backup battery with the SRAM.

12. The automotive computing device of claim 11, wherein the power
control circuitry is configured to place the SRAM in a low power, high impedance
state.

13. The automotive computing device of claim 11, wherein the power
control circuitry is configured to isolate the SRAM and the backup battery from
other system components.

21. The automotive computing device of claim 10 further comprising low voltage detection circuitry operably coupled with the one or more microprocessors and configured to detect when the automotive voltage source has dropped out of regulation and generate a signal to the microprocessor indicating the same.

22. The automotive computing device of claim 21, wherein the one or more microprocessors are configured to receive said signal and effect one or more copy operations responsive thereto.

23. The automotive computing device of claim 22, wherein said copy operations can copy pages from volatile storage to SRAM.

24. An automobile embodying the automotive computing device of claim 10.

25. An automotive computing device comprising:

one or more SRAMs;

one or more backup batteries; and

power control circuitry configured to:

detect when a voltage powering the one or more SRAMs has dropped out of regulation; and

automatically incorporate the one or more backup batteries to power the one or more SRAMs.

1 **26.** The automotive computing device of claim 25, wherein the one or
2 more backup batteries comprise one or more cell batteries.

3
4 **27.** The automotive computing device of claim 25, wherein the one or
5 more backup batteries comprise one or more lithium cell batteries.

6
7 **28.** The automotive computing device of claim 25, wherein the power
8 control circuitry is configured to place the one or more SRAMs in a low power
9 state.

10
11 **29.** The automotive computing device of claim 25, wherein the power
12 control circuitry is configured to isolate the one or more backup batteries and the
13 one or more SRAMs from other system components.

14
15 **30.** The automotive computing device of claim 25, wherein the power
16 control circuitry is configured to place the one or more SRAMs in a low power
17 state before it incorporates the one or more backup batteries to power the one or
18 more SRAMs.

19
20 **31.** ~~An~~ automobile embodying the computing device of claim 25.

21
22 **32.** An automotive computing system comprising:
23 one or more backup batteries;
24 one or more SRAMs selectively couplable to the one or more backup
25 batteries and configured to hold one or more pages that have been written to in the

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1 computing system, the one or more backup batteries being provided so that they
2 can be coupled to the SRAM in an event of an abrupt power shut down.

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4 **33.** The automotive computing system of claim 32, wherein the one or
5 more backup batteries comprise cell batteries.

6
7 **34.** An automotive computing system comprising:
8 one or more microprocessors configured to be powered by a vehicle voltage
9 source;

10 non-volatile storage coupled with the one or more microprocessors and
11 configured to hold one or more object store pages for the computing system;

12 volatile storage coupled with the one or more microprocessors and
13 configured to hold one or more object store pages that it receives from the non-
14 volatile storage;

15 static random access memory (SRAM) operably coupled with the one or
16 more microprocessors, the SRAM being configured to receive one or more pages,
17 under the influence of the one or more microprocessors, from one or more of the
18 non-volatile storage or volatile storage;

19 a backup battery couplable with the SRAM to provide power in the event
20 that a voltage rail associated with the voltage source drops out of regulation;

21 low voltage detection circuitry operably coupled with the one or more
22 microprocessors and configured to detect when the voltage rail drops below a
23 predetermined value and generate a signal to the one or more microprocessors
24 indicating the same; and

25 power control circuitry configured to:

1 detect when the voltage rail drops out of regulation; and
2 automatically incorporate the backup battery to power the SRAM.
3

4 **35.** A vehicle embodying the computing system of claim 34.
5

6 **36.** An automotive computing device data preservation method
7 comprising:

8 detecting when a voltage associated with operation of an automotive
9 vehicle drops out of regulation;

10 responsive to said detecting, placing an SRAM carried on the automotive
11 vehicle in a low power state; and

12 backing up the SRAM with a backup battery.
13

14 **37.** The automotive computing device data preservation method of
15 claim 36 further comprising placing the SRAM in the lower power state before
16 backing up the SRAM with the backup battery.
17

18 **38.** The automotive computing device data preservation method of
19 claim 36 further comprising isolating the backup battery and the SRAM from
20 other system components.
21

22 **39.** The automotive computing device data preservation method of
23 claim 36 further comprising after said detecting, writing data from DRAM carried
24 on the automotive vehicle into the SRAM.
25

1 **40.** An automotive computing device data preservation method
2 comprising:

3 detecting an abrupt automotive vehicle power shut down;
4 responsive to said detecting, placing an SRAM carried on the automotive
5 vehicle in a low power state; and
6 backing up the SRAM in its low power state with a backup battery.

7
8 **41.** The automotive computing device data preservation method of
9 claim 40 further comprising placing the SRAM in the lower power state before
10 backing up the SRAM with the backup battery.

11
12 **42.** The automotive computing device data preservation method of
13 claim 40 further comprising isolating the backup battery and the SRAM from
14 other system components.

15
16 **43.** An automotive computing device data preservation method
17 comprising:

18 maintaining an object store for the computing device in flash memory that
19 is carried by an automotive vehicle;

20 writing pages of the object store into DRAM that is carried by the
21 automotive vehicle;

22 writing pages of the DRAM into SRAM that is carried by the automotive
23 vehicle in the event the DRAM pages are attempted to be written to; and

24 battery-backing the SRAM in the event of an abrupt power shut down
25 condition.

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2 **44.** The automotive computing device data preservation method of
3 claim 43 further comprising detecting the abrupt power shut down condition and
4 responsive thereto, placing the SRAM in a low power state.

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6 **45.** The automotive computing device data preservation method of
7 claim 44 further comprising placing the SRAM in the lower power state before
8 battery-backing the SRAM.

9
10 **46.** The automotive computing device data preservation method of
11 claim 43 further comprising isolating the battery-backed SRAM from other system
12 components.

13
14 **47.** The automotive computing device data preservation method of
15 claim 43 further comprising copying one or more pages from DRAM to SRAM in
16 the event of the power shut down condition.

17
18 **48.** A method of operating an automotive computing device comprising:
19 providing an automotive computing device having flash memory that can
20 contain read only pages, DRAM for holding pages from the flash memory, and
21 SRAM for holding DRAM pages that are written to;
22 detecting when a voltage powering the SRAM drops out of regulation;
23 placing the SRAM in a low power state responsive to said voltage dropping
24 out of regulation; and
25 backing up the SRAM with a backup battery.

